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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re application of	:	**Confirmation No. 2420**
Ryoumei OMOTE et al.	:	Docket No. 00177/530850
Serial No.09/486,890	:	Group Art Unit 1771
Filed May 26, 2000	:	Examiner Andrew Piziali
TRANSPARENT CONDUCTIVE FILM FOR USE IN TRANSPARENT TOUCH PANEL, TRANSPARENT TOUCH PANEL USING THE TRANSPARENT CONDUCTIVE FILM, AND METHOD FOR FABRICATING TRANSPARENT CONDUCTIVE FILM	:	

THE COMMISSIONER IS AUTHORIZED TO CHARGE ANY DEFICIENCY IN THE FEE FOR THIS PAPER TO DEPOSIT ACCOUNT NO. 23-0975.

APPELLANTS' BRIEF

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This is an appeal from the final rejection of claims 16, 19, 21, 23, 26, 28, 30, 32, 33, 36, 38, 40, 42, 44, 45, 52 and 54.

1. REAL PARTY IN INTEREST

The real party in interest is Nissha Printing Co., Ltd.

2. RELATED APPEALS AND INTERFERENCES

There are no related appeals and interferences.

3. STATUS OF CLAIMS

The only claims pending in the application are claims 16-55, of which claims 17, 18, 20, 22, 24, 25, 27, 29, 31, 34, 35, 37, 39, 41, 43, 47, 49, 51, 53 and 55 have been withdrawn from further consideration as being directed to non-elected subject matter in response to a restriction requirement; and claims 46, 48 and 50 have been allowed. The remaining claims are claims 16, 19, 21, 23, 26, 28, 30, 32, 33, 36, 38, 40, 42, 44, 45, 52 and 54, which are the appealed claims, and are set forth in the Appendix.

The original claims are claims 1-15. By Preliminary Amendment filed with the present application on March 6, 2000, claims 1-15 were replaced by new claims 16-55, which are the claims currently pending in the application. The only other amendments submitted during prosecution were the amendments to claims 23 and 26, which were in response to a rejection in the first Office Action on the merits, under the second paragraph of 35 U.S.C. §112, which rendered that rejection moot.

4. STATUS OF AMENDMENTS

No amendment was submitted after the final rejection.

5. SUMMARY OF THE INVENTION

As apparent from claim 16, which is the only independent claim on appeal, the present invention is directed to a transparent conductive film for use in a transparent touch panel in which a lower electrode and an upper electrode are stacked so as to be spaced from each other by spacers, the transparent conductive film being provided on an electrode substrate of at least one of the electrodes and thereby forming the electrode, wherein the transparent conductive film has, in its surface shape, an arithmetic mean roughness (Ra) within a range of $0.4\ \text{nm} \leq Ra \leq 4.0\ \text{nm}$ and a root-mean-square roughness (Rms) within a range of $0.6\ \text{nm} \leq Rms \leq 3.0\ \text{nm}$. (Page 5, line 24 to page 6, line 10 of the specification.)

According to the present invention, a surface shape (roughness) suitable for light touch panel input can be obtained. The light touch input is determined by the contact area between the upper electrode and the lower electrode. The transparent conductive film can be formed with metallic oxide.

That is, as described on page 19, line 23 to page 20, line 19 of the specification,

"[t]he transparent conductive film 1 is so formed that the arithmetic mean roughness (Ra) of the surface shape is within a range of 0.4 nm ≤ Ra ≤ 4.0 nm and the root-mean-square roughness (Rms) of the surface shape is within a range of 0.6 nm ≤ Rms ≤ 3.0 nm. The reason of this is that forming the transparent conductive film 1 like this makes it possible to obtain a film in which crystal grain aggregates are arranged compact as shown in Fig. 1 and yet which has a good smoothness so that a contact area for input operation can promptly be ensured as shown in Figs. 11 and 12. More specifically, if the arithmetic mean roughness (Ra) is less than 0.4 nm or if the root-mean-square roughness (Rms) is less than 0.6 nm, a considerably dot-like contact results, which is unsuitable for input operation because of less contact area (see Fig. 5 and Figs. 17 to 19). Also, even if either one of the arithmetic mean roughness (Ra) and the root-mean-square roughness (Rms) is within the foregoing range, proper inputs could not be expected. Further, if the arithmetic mean roughness (Ra) is over 4.0 nm or if the root-mean-square roughness (Rms) is over 3.0 nm, sliding characteristics of the transparent conductive film 1 are adversely affected, undesirably." [Emphasis added.]

Therefore, as defined in claim 16, the transparent conductive film has, in its surface shape, an arithmetic mean roughness (Ra) within a range of 0.4 nm ≤ Ra ≤ 4.0 nm and a root-mean-square roughness (Rms) within a range of 0.6 nm ≤ Rms ≤ 3.0 nm, which ensures that a surface shape (roughness) suitable for light touch panel input can be obtained.

6. ISSUES

1. Whether claims 16, 19, 23, 26, 28, 30, 32-33, 36, 38, 40, 42, 44-45, 52 and 54 are unpatentable under 35 U.S.C. §103(a) over Mikoshiba et al. in view of Applicants' Disclosure.

2. Whether claim 21 is unpatentable under 35 U.S.C. §103(a) over Mikoshiba et al. in view of Applicants' Disclosure and further in view of Yukinobu et al.

7. GROUPING OF CLAIMS

Claims 16, 19, 23, 26, 28, 30, 32-33, 36, 38, 40, 42, 44-45, 52 and 54 are rejected under 35 U.S.C. §103(a) as being unpatentable over Mikoshiba et al. (USP 5,225,273) in view of Applicants' Disclosure.

The claims of this group do not stand or fall together. Claims 19, 23, 26, 52 and 54 are separately patentable for reasons which will be set forth below.

Claim 21 is rejected under 35 U.S.C. §103(a) as being unpatentable over Mikoshiba et al. in view Applicants' Disclosure and further in view of Yukinobu et al. (USP 5,411,792).

8. ARGUMENT

Re: Issue 1

Mikoshiba et al. disclose, under the section discussing the prior art in column 1, that a transparent touch panel is widely used as an input unit in microcomputers; and that a transparent electroconductive laminate is used in the transparent touch panel. (Column 1, lines 14-32.) The reference then discloses under the Summary of the Invention section beginning in column 3, a transparent electroconductive laminate having a transparent electroconductive layer composed mainly of indium oxide deposited on a transparent planar substrate, wherein the electroconductive layer is composed of a crystalline phase and an amorphous phase in which the crystalline phase is preferably composed of crystal grains with a size of less than 1 μm and the crystal grains are placed in a sea of the amorphous phase and/or the crystal grains are separated from each other by a networked amorphous phase. (Column 3, line 64 to column 4, line 8.) Mikoshiba et al. also describe a process for production of the transparent electroconductive laminate, beginning at column 9, line 32.

A surface shape (surface roughness) which is suitable for light touch input depends on the distance between projections on the surface as well as the depth direction. Thus, although the grain size is described in Mikoshiba et al., the reference does not disclose the depth information, resulting in a failure in expressing the surface shape. That is, Mikoshiba et al. fail to teach or suggest setting the arithmetic mean roughness (Ra) and the root-mean-square roughness (Rms) respectively within specified ranges of the present invention, to thus enable stable, light touch inputs.

In contrast, in the present invention, as described above, the transparent conductive film has, in its surface shape, the specified arithmetic mean roughness (Ra) and the specified root-mean-square roughness (Rms), that is, crystal grains can be formed as an aggregate to obtain the surface shape (surface roughness) having a large degree of freedom. Therefore, the film having a large distance between projections on the surface as well as a large average depth can be formed, thus obtaining a shape suitable for light touch input.

Since a depth (roughness) is obtained in proportion to only a grain size by Mikoshiba et al. in which fillers are merely dispersed, it is difficult to obtain an intermediate roughness which is suitable for light touch input. Moreover, although a dense film can be formed by sputtering or ion-plating as described in Mikoshiba et al., a shape suitable for light touch input can not be obtained because projections can not be formed as an aggregate. Moreover, the trapezoidal shape of claim 23 of the present application can not be obtained by only filler dispersion for a similar reason.

Even though, in Mikoshiba et al., silicon oxide is used for a material of the film and the film has the same contact area as the present invention, the surface shape of Mikoshiba et al. is different from the present invention and thus there is a great difference between this reference and the present invention in electrical conductivity.

The Examiner relies on Applicants' Disclosure for the structure of the touch panel of the prior art. However, even if this structure were combined with the Mikoshiba et al. reference, the result of such combination would still not suggest the presently claimed invention because, as indicated above, Mikoshiba et al. fails to disclose or suggest the transparent conductive film of the present invention.

Separate Patentability Arguments for Claims 19, 23, 26, 52 and 54

In claim 19, the ranges for the arithmetic mean roughness and root-mean square roughness are narrower than the corresponding ranges in claim 16. Since Mikoshiba et al. fail to disclose or suggest the ranges in claim 16, *a fortiori* the ranges in claim 19 are not suggested by the reference.

Claims 23 and 26 further limit claims 16 and 19, respectively, by requiring Rp/Rmax to be 0.55 or less, and by requiring a cross section of grain aggregates forming the surface shape to be formed into a trapezoidal or rectangular shape. The Examiner does not specifically mention the

limitations recited in claim 23 or 26 in the Final Rejection, but broadly asserts that considering that the ITO transparent conductive film of Mikoshiba et al. is formed by a substantially identical method utilized by the present application, it appears that the ITO electrode of Mikoshiba et al. possesses the claimed surface roughness properties. However, as stated previously, this reasoning cannot be maintained, in light of the Examiner's statement of reasons for allowance regarding the process claims. The Examiner has not met the PTO burden of providing evidence tending to show that the film of Mikoshiba et al. possesses the properties claimed by Appellants.

With regard to claims 52 and 54, which are product-by-process claims, the Examiner has not offered any "... rationale tending to show that the claimed product appears to be the same or similar to that of the prior art...." (MPEP 2113.) In fact, the Examiner has allowed process claims 46 and 48 from which claims 52 and 54 depend. According to the MPEP, once the Examiner has established that the claimed product appears to be the same or similar to that of the prior art, the burden shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product. However, no such rationale has been provided by the Examiner, and therefore the rejection over claims 52 and 54 is improper.

For these reasons, Appellants take the position that the subject matter of the rejected claims is patentable over Mikoshiba et al. in view of Applicants' Disclosure.

Re: Issue 2

The comments set forth above under Issue 1, concerning Mikoshiba et al. and Applicants' Disclosure, are equally applicable to Issue 2, it again being noted that claim 21 is dependent on claim 16.

Yukinobu et al. disclose many kinds of resins included in a transparent conductive film. Therefore, even though the film has the same contact area, the construction of the Yukinobu et al. film is different from that of the present invention, and thus there is a great difference between this reference and the present invention in electrical conductivity.

In Yukinobu et al., since many kinds of resins are included in the film, it is difficult to adjust the depth, resulting in difficulty in obtaining the above suitable shape for light touch input.

Accordingly, even if the references and Applicants' Disclosure were combined in the manner suggested by the Examiner, the result of such combination would still not suggest the subject matter of claim 21.

Response to Advisory Action

In the Advisory Action mailed May 18, 2004, the Examiner states that Appellants have failed to show that the article taught by the prior art does not possess the claimed arithmetic mean roughness and root-mean-square roughness. The Examiner is taking the position that the transparent conductive electrode film taught by Mikoshiba et al. is formed by a substantially identical method compared to the method utilized by Appellants (in the Final Rejection the Examiner refers to Examples 1-4 on pages 38-46 of the present specification), as a result of which it appears that the electrode of Mikoshiba et al. possesses the presently claimed surface roughness properties.

However, the film of Mikoshiba et al. is formed by sputtering or ion-plating. (Column 9, lines 41-45.) On the other hand, all of the method of production claims in the present application (claims 46-51) require a coating or printing process using a sol-gel material to form the film having the recited roughness characteristics. Therefore, contrary to the position taken by the Examiner, the film taught by Mikoshiba et al. is not formed by a substantially identical method compared to the method for producing the film of the present invention.

Further in this regard, Appellants note that claims 46, 48 and 50, which are drawn to a method for producing the film, have been allowed by the Examiner. In his statement of reasons for allowance of these claims (item 6 on page 5 of the Office Action of December 10, 2003), the Examiner states that:

> The prior art fails to teach or suggest a method of fabricating a transparent conductive film for use in a transparent touch panel comprising coating or printing with a sol-gel material, performing a drying process, then an oxidation burning process at a temperature increasing rate of 40-60C per minute within a temperature range of 200-400C, followed by a reduction burning process.

At the time of issuing his statement of reasons for allowance, the prior art applied by the Examiner in rejecting the claims included the Mikoshiba et al. reference. Appellants respectfully

submit that, considering the statement of reasons for allowance, the method of forming the film taught by Mikoshiba et al. cannot possibly be the same or substantially the same as the method used by Appellants to form the film of the claims on appeal.

The Examiner's conclusion that the presently claimed surface roughness properties appear to be possessed by the film of Mikoshiba et al., is based on the argument that the film taught by Mikoshiba et al. is formed by a substantially identical method compared to the method of the present invention. Since, for the reasons indicated above, this argument is fallacious, Appellants respectfully submit that the Examiner has not met the PTO burden of providing a rationale or evidence tending to show that the film of Mikoshiba et al. possesses the presently claimed surface roughness properties. (MPEP 2112, 2112.01 and 2113.)

A copy of the claims on appeal is set forth in an Appendix immediately following the conclusion and signature, and is incorporated herein by reference.

9. CONCLUSION

The claims on appeal are directed to subject matter which is patentable over the applied prior art, and therefore the rejections of these claims should be reversed.

This Brief is submitted in triplicate with the requisite fee of $330.00.

Respectfully submitted,

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APPENDIX

The claims on appeal are as follows:

16. A transparent conductive film for use in a transparent touch panel in which a lower electrode and an upper electrode are stacked so as to be spaced from each other by spacers, the transparent conductive film being provided on an electrode substrate of at least one of the electrodes and thereby forming the electrode, wherein

the transparent conductive film has, in its surface shape, an arithmetic mean roughness (Ra) within a range of $0.4 \text{ nm} \leq Ra \leq 4.0 \text{ nm}$ and a root-mean-square roughness (Rms) within a range of $0.6 \text{ nm} \leq Rms \leq 3.0 \text{ nm}$.

19. A transparent conductive film for use in a transparent touch panel according to Claim 16, wherein the transparent conductive film is composed of an indium oxide - tin oxide film and has, in its surface shape, an arithmetic mean roughness (Ra) within a range of $0.4 \text{ nm} \leq Ra \leq 3.0 \text{ nm}$ and a root-mean-square roughness (Rms) within a range of $0.6 \text{ nm} \leq Rms \leq 2.0 \text{ nm}$.

21. A transparent conductive film for use in a transparent touch panel according to Claim 16, wherein the transparent conductive film is composed of a fluorine- or antimony-added tin oxide film and has, in its surface shape, an arithmetic mean roughness (Ra) within a range of $0.4 \text{ nm} \leq Ra \leq 4.0 \text{ nm}$ and a root-mean-square roughness (Rms) within a range of $0.6 \text{ nm} \leq Rms \leq 3.0 \text{ nm}$.

23. A transparent conductive film for use in a transparent touch panel according to Claim 16, wherein given a center line depth Rp and a maximum roughness Rmax with respect to the surface shape, a parameter Rp/Rmax representing the surface shape is set to 0.55 or less, whereby a cross section of grain aggregates forming the surface shape is formed into a trapezoidal or rectangular shape.

26. A transparent conductive film for use in a transparent touch panel according to Claim 19, wherein given a center line depth Rp and a maximum roughness Rmax with respect to the surface shape, a parameter Rp/Rmax representing the surface shape is set to 0.55 or less,

whereby a cross section of grain aggregates forming the surface shape is formed into a trapezoidal or rectangular shape.

28. A transparent conductive film for use in a transparent touch panel according to Claim 16, wherein the transparent conductive film is formed by a coating or printing process with a sol-gel material.

30. A transparent conductive film for use in a transparent touch panel according to Claim 19, wherein the transparent conductive film is formed by a coating or printing process with a sol-gel material.

32. A transparent conductive film for use in a transparent touch panel according to Claim 23, wherein the transparent conductive film is formed by a coating or printing process with a sol-gel material.

33. A transparent touch panel in which the transparent conductive film according to Claim 16 is provided on an electrode substrate of at least one electrode out of the lower electrode and the upper electrode and thereby forming the electrode.

36. A transparent touch panel in which the transparent conductive film according to Claim 19 is provided on an electrode substrate of at least one electrode out of the lower electrode and the upper electrode and thereby forming the electrode.

38. A transparent touch panel in which the transparent conductive film according to Claim 23 is provided on an electrode substrate of at least one electrode out of the lower electrode and the upper electrode and thereby forming the electrode.

40. A transparent touch panel in which the transparent conductive film according to Claim 26 is provided on an electrode substrate of at least one electrode out of the lower electrode and the upper electrode and thereby forming the electrode.

42. A transparent touch panel in which the transparent conductive film according to Claim 28 is provided on an electrode substrate of at least one electrode out of the lower electrode and the upper electrode and thereby forming the electrode.

44. A transparent touch panel in which the transparent conductive film according to Claim 30 is provided on an electrode substrate of at least one electrode out of the lower electrode and the upper electrode and thereby forming the electrode.

45. A transparent touch panel in which the transparent conductive film according to Claim 32 is provided on an electrode substrate of at least one electrode out of the lower electrode and the upper electrode and thereby forming the electrode.

52. A transparent conductive film for use in a transparent touch panel fabricated by the method for fabricating a transparent conductive film for use in a transparent touch panel according to Claim 46.

54. A transparent conductive film for use in a transparent touch panel fabricated by the method for fabricating a transparent conductive film for use in a transparent touch panel according to Claim 48.